

REMARKS

Claims 26 and 77-82 are pending in the application. Applicants reserve the right to pursue the original claims and other claims in this and other applications.

Claims 26, 77, 78, 81, and 82 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,976,222 ("Yang"). This rejection is respectfully traversed.

The Office Action fails to establish a *prima facie* case of obviousness at least because Yang does not teach or suggest every element of independent claims 26, 77, and 78. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 26 recites, a "plasma etching composition" comprising "at least two fluorocarbons and ammonia, wherein said at least two fluorocarbons and said ammonia form a reactive mixture, and wherein said at least two fluorocarbons are selected from the group consisting of fluorohydrocarbons, chlorofluorocarbons, and chlorofluorohydrocarbons." Applicant respectfully submits that Yang does not teach or suggest these limitations. To the contrary, Yang discloses "a fluorochemical containing exhaust gas from a semiconductor fabrication facility." (column 7, lines 5-6). Applicant respectfully submits that an exhaust gas cannot be used as a plasma etching composition.

Yang also teaches that the "fluorochemical containing exhaust gas [is] from a semiconductor fabrication facility conducting an etch or clean process step...comprising a diluent gas, such as nitrogen, and fluorochemicals comprising potentially NF₃, SF₆, CF₄,

CHF₃, CH₃ F, C₂ F₆, C₂ HF₅, C₃ F₈, C₄ F₈, HF, F₂ and mixtures of these gases.” (column 7, lines 5-11). The Office Action interprets this language as meaning that Yang teaches that a semiconductor fabrication facility conducts a process using one etching composition that may include any of these gases. Applicant respectfully disagrees with this interpretation.

In fact, Yang teaches that the exhaust gas may be from an “etch or clean process step” and that the exhaust gas may “potentially” comprise “NF₃, SF₆, CF₄, CHF₃, CH₃ F, C₂ F₆, C₂ HF₅, C₃ F₈, C₄ F₈, HF, F₂ and mixtures of these gases.” (column 7, lines 5-11, emphasis added). Yang does not specify which of these components may be used in an etching step and which may be used in a cleaning step. It is clear from the use of the terms “potentially” and “mixtures” that Yang does not teach that all of these components may be used in an etching step. Therefore, the most that can fairly be understood from the teaching of Yang is that some (not all) of the listed components may be used in an etching step. Because Yang does not specify which of the components may actually be used in an etching step, Yang does not teach that the three components selected by the Office Action from Yang’s list of components may be used in an etching step. Therefore, Yang does not teach or suggest all the claim limitations of claim 26, and the Office Action has not established a *prima facie* case for obviousness, with respect to claim 26.

Also, it should be noted that components that are suitable for cleaning compositions are not necessarily suitable for etching compositions. An etching composition is generally used to etch or cut a particular material, while a cleaning composition is only used to remove residue and debris and therefore must not etch or cut the same material.

Since Yang does not teach or suggest all of the limitations of claim 26, claim 26 is not obvious over the cited reference. Applicant also submits that claims 77 and 78 are allowable for reasons similar to the reasons given above with respect to claim 26.

Furthermore, the Office Action fails to establish a *prima facie* case of obviousness because the Office Action has not provided proper motivation to combine the references. To establish a *prima facie* case of obviousness there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. The teaching or suggestion to make the claimed combination must be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Yang discloses that an "exhaust gas from a semiconductor fabrication facility conducting an etch or clean process may "potentially" comprise "NF₃, SF₆, CF₄, CHF₃, CH₃F, C₂F₆, C₂HF₅, C₃F₈, C₄F₈, HF, F₂ and mixtures of these gases" and further "include[s]... CO, CO₂, H₂O, O₂, CH₄, SiF₄, SiH₄, COF₂, N₂O, NH₃, O₃, Ar, Br₂, BrCl, CCl₄, Cl₂, H₂, HBr, HCl, He, and SiCl₄." (column 7, lines 5-13). The Office Action states that "it would have been obvious...to select any combination of etchant gasses...that would effectively accomplish the disclosed composition because these etchants gases are used for etching and cleaning operations." (Office Action, page 3). Applicant respectfully disagrees with this statement.

The motivation stated by the Office Action fails to establish a *prima facie* case for obviousness at least because the motivation does not suggest the desirability of the claimed invention. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability

of the combination.” *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990) (emphasis added). In this case, the Office Action suggests that one skilled in the art would be motivated to make any combination of any number of the components listed by Yang merely because the individual components are known to be used in an etching or a cleaning operation. Applicant respectfully submits that this alleged motivation does not show the desirability of using the specific combinations of components listed in independent claims 26, 77, and 78 in an etching composition. This is one more reason why the claims are allowable.

Claim 82 depends from claim 26 and is patentable at least for the reasons mentioned above. Claims 81 depends from claim 78 and is patentable at least for the reasons mentioned above. Applicant respectfully requests that the rejection be withdrawn and the claims allowed.

Claims 79 and 80 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yang in view of U.S. Patent No. 6,277, 733 (“Smith”). This rejection is respectfully traversed.

Claim 79 and 80 depend from claim 78 and are allowable over Yang for the reasons set forth above. Smith does not cure the deficiencies of Yang.

Moreover, the Office Action fails to establish a *prima facie* case of obviousness at least because the Office Action has not provided proper motivation to combine the references. Smith discloses a plasma composition used for “a clean up step.” (column 4, lines 41-42). Smith further discloses that “this step will neither oxidize any exposed

portions of underlying oxygen sensitive conductor 420, nor will it substantially etch any exposed portions of silicon nitride." (column 4, lines 43-46).

The Office Action states that the motivation to combine a specific component of the cleaning step of Smith with the alleged composition of Yang would be "for the purpose of removing hydrocarbon residue left on the metal structure." (Office Action, page 4). Applicant respectfully submits that this statement would not provide motivation to combine, because combining a component from a clean up step with components used in an etching step will not result in a combined cleaning and etching step as suggested by the Office Action. As discussed above, a cleaning step must not etch a material, while an etching step must etch the same material. Therefore, because the two steps cannot be combined, one of ordinary skill in the art would not be motivated to try. Accordingly, Applicant respectfully requests that the rejection of claims 79 and 80 be withdrawn and the claims allowed.

In view of the above Remarks, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

By Thomas J. D'Amico
Thomas J. D'Amico

Registration No.: 28,371

David T. Beck

Registration No.: 54,985

DICKSTEIN SHAPIRO LLP

1825 Eye Street, NW

Washington, DC 20006-5403

(202) 420-2200

Attorneys for Applicant